Geography of Man in Relation to Eugenics. These chapters are drawn largely from Dr. Davenport's book reviewed above.

THREAD ATTACHMENTS BETWEEN NUCLEAR AND CYTOPLASMIC BODIES

I have read with much interest Mr. E. W. Roberts' article, "The Modern Theory of the Cell as a Complex of Organized Units," in *Transactions* of April, 1912.

Being an ardent worker in Cytology and having spent some years in trying to unravel a few of the many existing cytological problems, I was particularly attracted by some of the remarks and views advanced by Mr. Roberts in his highly attractive and interesting contribution.

Although many of Mr. Roberts' remarks appear at present of a very speculative character, and will require, possibly, many years of close microscopical work before they can either be proved or disproved; yet to me whilst reading them they have a charm of their likely possibilities.

Work in connection with a subject such as this presents great difficulties, both concerning the microscopical as well as the chemical character of the cell.

I was not aware of the fact until I read this paper that the cells of *Spirogyra* during life contained connecting filaments between each pyrenoid body and the nucleus; although I have examined *Spirogyra* many times in connection with various cytological work; this only proves to me how easily most important structure may evade the careful searchings of, I think I may say without egotism, a trained eye.

Apart from perhaps another point of interest in this cytological contribution the finding of the presence of these connecting filaments, *if beyond doubt,* is a wonderful achievement and a splendid addition to present knowledge of the complexity of the cell. I think Mr. Roberts is quite correct in his statement, that the question whether these connecting threads exist between the vegetative and nuclear groups of other types of cells is a field that has been entirely untouched up to the present.

Seriously considering the value of further development in this line of research, I felt myself irresistibly compelled to make investigations in this direction.

I chose for my subjects to work upon *Allium* and *Hyacinthus*. In my laboratory work, these have been almost classical objects and I have done an endless amount of work upon them for years past. Accordingly I was most anxious to ascertain whether the keen attention which I had given to the examination of other detail and structures, upon which I was working, had so clouded my eyes that it had shut out from view the possible presence of threads connecting nuclear with protoplasmic bodies.

At first I resolved to examine again some of my many and valued sections illustrating highly interesting phases in mitosis. This I did, but after their once more careful study, I was unable to convince myself of the presence of any structures such as Mr. Roberts described in *Spirogyra*, although there were several instances which left conflicting doubts in my mind. Considering some of these specimens again on another occasion, I came to the definite conclusion since nearly all of them were stained and specially differentiated in order to show the nucleus and nuclear structures only, leaving the surrounding protoplasm almost indistinct by contrast, that it was evident such a contrast of the staining between these two structures was useless in order to establish the presence or non-presence of these nuclear attachments.

After a number of efforts to get a uniform stain, I succeeded by cutting some extremely thin transverse sections (2μ) of *Allium* (growing root tips). These I fixed in the usual manner to the slips *without* the aid of fixitive (this latter procedure can readily be understood as most important when fine detail is to be searched for). I have always found that it is much easier with very thin sections to get equality of staining by carefully watching the differentiation process under the microscope. This is not the case with thicker sections, say 10μ or more. The nucleus in these thicker sections still holds the stain deeply even when that in the cytoplasm has been entirely extracted. As mentioned above I felt confident that this equality of stain over the whole cell inclusion was absolutely important and essential to future success, and could only be obtained by working upon very thin sections.

When the time came to examine these last preparations, using critical illumination with oil immersion, condenser, etc., my hopes

and expectations were rewarded. Although not present in the majority of cells, there were many in which distinct filar attachments could be seen between chromatin bodies in the nucleus and granules in the cytoplasm. They were not numerous in the individual cells, the most I counted was two, and in a very few instances *three*. The fact of their apparent scarcity and not finding more than three in any one cell examined, may quite possibly be accounted for by the extreme thinness of the sections and the plane of cutting. As far as I can at present make out, these structures cannot be seen when the cell is not strictly in a vegetative condition. However, notwithstanding the comparative few cases in which they could be observed, the fact of their being distinctly seen in many cells and in several separate sections of different series, may be taken, I think, as proof of their being present in the cells of the growing root tips of the onion.

Up to the present I have not had the time to cut and examine similarly treated sections of the root tips of *Hyacinthus,* but I feel almost certain they will not be found missing here, and before long I hope to be able to extend my work and observations in this direction to other vegetable tissues as well as some of the various animal cells. I adopted Heidentain's iron haematoxytin method of staining, giving baths of not less than twelve hours both in the iron solution and the haematoxytin and differentiating *slowly* in a very weak solution of the iron alum. I think twenty minutes at least should be taken for this purpose. It seems to me useless to attempt any work upon sections that are much over 2μ in thickness for reasons already stated. I am inclined to think that it would be an advantage to the above process to use as counter stains eosin and acid rubin, particularly a watery solution of the former. This in my hands works very well after staining with iron haematoxytin. It is not always easy to prevent diffused staining with acid rubin, but when successful results are obtained with either eosin or rubin even better observation results may be expected.

In conclusion I feel sure there is much of great interest awaiting the careful and persevering worker in this field of research, and in the event of these filar attachments between nucleus and

cytoplasm being proved a constant feature it is difficult at the moment to appreciate their full meaning.

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NEW MODELS IN BINOCULAR MICROSCOPES

The optical works of Ernst Leitz, Wetzlar, Germany, have introduced a new model of Binocular Microscope, which they designate as the "Greenough-Leitz." It is interesting to note that new ideas have effected a considerable change in construction of this particular model in comparison with the older forms.

The new principles involved in the construction of the "Greenough-Leitz" are the result of frequent demands made upon manufacturers to provide certain modifications. The illustration (Fig. 1) will convince the reader that unusual stability is featured in the instrument. The coarse adjustment by rack and pinion is situated in the column of the stand, independent of the prism tubes, the latter being permanently a part of a heavy bent arm which is in turn attached to the rack arrangement of the stand.

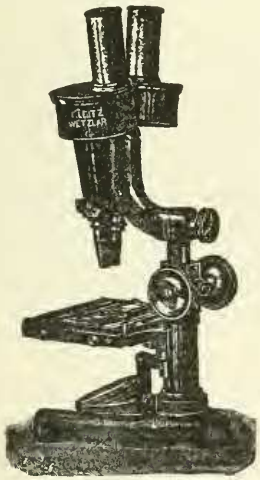

FIG. 1

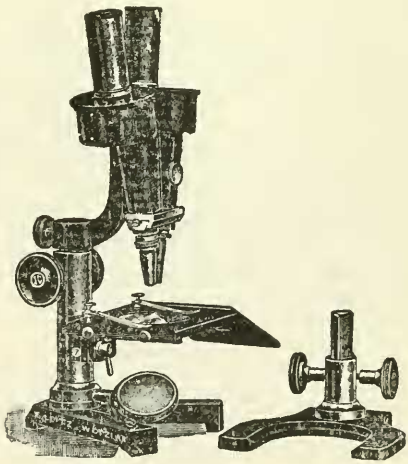

FIG. 2

As a Dermatoscope and for the examination of large surfaces an arrangement is provided as shown in Fig. 2. The auxillary